The Power of the Inanimate Object: Food

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Abstract

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Every day, new foods and restaurants and novel ways to indulge are being thrown into the market, waiting for us consumers to *consume*. To what cost? To the cost of an obesity epidemic in the United States. The prevalence of this chronic disease is rising despite the various attempts to combat it with diets and pills and surgeries; yet, the public's health continues to be at risk. How does the way we shape the environment of our country influence our eating habits and who contributes most to such decisions?

The first task is to understand what the cause of over and mindless eating is that leads to obesity and subsequently many other chronic conditions. The second is to explore the impact of food companies and their efforts to target adolescents and take control of the early on eating habits formed. From here, an investigation of what the right approach to curbing obesity could be in terms of mindset and combatting the outside sources of influence. The final step will be an introduction to a psychology research intervention I am currently conducting to make use of the rebellious nature of adolescents to counteract the efforts of junk food companies to dictate the food we choose to put into our bodies, hoping to encourage healthier food consumption.

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Table of Contents

Introduction

To ignore the obesity crisis in this country would be letting the health of the people spiral into ruination. Despite the innovative culture of health care and medical technology in the past 50 years, the rise in chronic illnesses seems to be insurmountable. But why is it that in a time of people traveling to outer space and the most vivid of dreams coming to life, that we are unable to find a solution to obesity? Are we approaching the problem incorrectly? The obesity epidemic has been recognized as a serious public health concern for quite some time but yet progress is stunted at the response of diet pills, starvation regimens, and surgeries. The effect of these solutions has only been a steady rise of obesity.

Obesity is an epidemic in the United States of America and this is evident in many different realms – physically, psychologically, and emotionally. We do not eat just to survive anymore, we eat for pleasure, we eat as a reward, we eat to deal with all the stresses that dictate life in the 21st century. Although, in the short term, it is satisfying to eat that extra piece of cake or drink the sugar-filled soda with a basket full of French fries, the long-term consequences are crippling. Solutions to this problem such as diets and surgeries have come to the table; studies have established that healthy eating and exercise are key to losing weight and maintaining; but then, why are the rates of obesity still rising?

A social component is always present, especially in this century where conversations, news, emotions, and even material goods are shipped around via some form of social communication. In some instances that is the media and various online social accounts, or the advertising industry, or simply the environment we place ourselves in at every step of our day. The way this plays into the food decisions we make is crucial to ensuring a healthy way of life.

These are not diseases that can be cured by vaccines, rather, conditions like obesity can very much be something we are inflicting on ourselves.

Human beings doing harm to other human beings. This exists in the way in which food companies are also perpetrating the obesity epidemic. They have found ways to manipulate our tongues to crave sugar even more than we biologically do already. They have worked advertising to their advantage to snag us at every corner of our lives. Better yet, they have targeted our children, catching them at an early age when their decision-making processes are still developing, the perfect time to make a kid your die-hard fan.

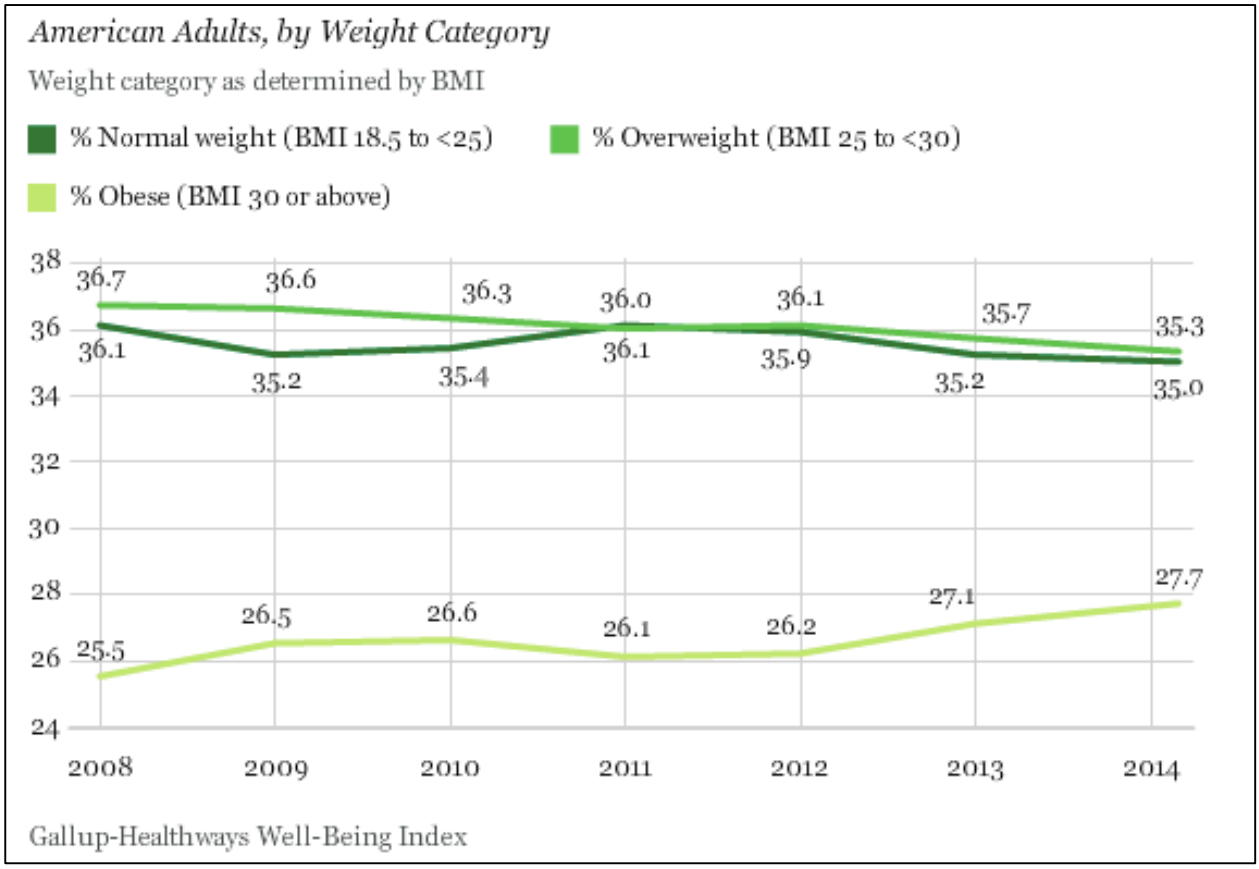
This is not the end of this fight, however. There has to be more and there is more that the country is doing to combat this epidemic. With the government enacting policies to reduce consumption of certain types of foods or drinks, psychologists working to understand our eating behaviors, and people becoming more mindful of what they are consuming, there is a chance to beat food and unravel the power of this inanimate object - food.

Chapter 1: The Obesity Epidemic

We are no longer at a time where there were just a few heavy-set people on the streets; being obese is becoming a norm. It can be seen in people, in the most popular restaurants, in the changes of seat size on airplanes, in our clothing departments - the evidence is all there. This epidemic is not simply of the physical nature of the body, but it extends as an emotional and psychological endeavor as well. The doctors have established this problem as a chronic disease, further implicating heart disease, diabetes, mental health concerns, etc., but the scare of such a classification still has obesity rates rising every day. There have been studies done to establish what causes obesity and how best a person should change their eating or exercise habits to decrease the onset of weight gain; but then, why are the rates of obesity still rising?

To define obesity with numbers is a simple task. It has been established that body mass index or BMI is a key measurement of obesity with a BMI of 25 to 29.9 kg/m2 indicating the person is overweight and a BMI of 30 kg/m2 or more demonstrating the individual has reached the mark of obesity. There is yet another category for people with a BMI greater than 40 kg/m2, delineating stage III obesity, or what one may casually refer to as “morbid obesity” (American Heart Association, 2016). Putting these classifications of BMI into real life perspective and evaluating the statistics make the relevance of this chronic disease even more prevalent. There are about 78 million adults and 13 million children just in the United States that experience the ramifications of obesity every day. This can be further described as one-third of U.S. adults are obese while another one-third of U.S. adults are overweight (AHA, 2016). This was not always the case - the shift in the control of weight began post 1980s. The American Heart Association (2016) cites a report made by the National Institutes of Health stating that the rate of obesity for adults age 20-74 more than doubled from the years 1962 to 2006. This amounted to an increase

of 13.4 percent to 35.1 percent. The CDC gives another perspective in stating that with this increase in obesity, the average adult has also increased its average weight to 26 pounds more than the average adult in the 1950s (AHA, 2016). Gallup poll's Healthways Well-Being index provides another set of statistics consisting of self-reported height and weight that is calculated into BMI (Inc, n.d.). The poll captures the obesity rates from 2008 to 2014.



Those adults classified as obese had BMI values of 30 and above, 25 to 29.9 for overweight individuals, 18.5 to 24.9 for normal weight, and less than 18.4 for underweight people.

This is an astounding shift in weight over a minimal amount of time. It seems unreasonable to think that all of a sudden people just began eating much more food than their

body could handle. The majority are gaining weight, regardless of race or gender, with an unusual trend directed at the heaviest individuals disproportionately gaining more weight than the rest of the population. These occurrences cannot be marked off as a fat person's problem; attributing it all to the person itself would be a mistake, but accusing environmental and cultural and biological cues might be more appropriate.

The 1980s called for a change in the dynamic of the work field. The number of manufacturing jobs decreased while the number of jobs that require sitting at a desk all day increased. Sedentary behavior during working hours have become the norm. Real minimum wage and consequently labor costs took a toll, making fast food even cheaper than before. Since then, life has become a series of events with few breaks permitted in order for the average person to succeed by the standards of society. We are constantly engaged in the stressed and busy day we create for ourselves, leaving no time to go home for a healthy home-cooked meal. Instead we are forced to indulge in the statistic that the average American spends about half of his food budget outside the home. In the process of eating out, people are also subjecting themselves to an increased consumption of calories. Brain Wansink of Cornell University and Collin Payne of New Mexico State University studied a set of cooking books developed over the years since 1936 and found that the calorie counts have increased by 63 percent since then. The American Heart Association (2016) states that compared to the 1950s, the average restaurant meal is four times larger; this includes the increase in sugary drink consumption 7 ounces in the 1950s to 42 ounces today. Irresistible looking food is one matter but irresistible and healthy food with appropriate proportions is close to impossible when dining out. Now we have an endless supply and variety of palatable and affordable foods that are easy to grab and go, multiple times throughout the day. Our swamped schedules also lead to irregular mealtimes - we eat when it's

convenient, not when we should at regular intervals throughout the day which contribute to a healthy body weight. With today's evolving nature in terms of science and technology, there has been a dramatic increase in "screen time" since the creation of televisions, computers, and smart phones that promote sedentary behavior. It allows people to engage in their stress outside of the office, consequently increasing stress levels and harming sleep patterns. All of these are triggers for what eventually could and has led to widespread obesity.

The concept of obesity may not be a new one, but it is, however, grounded in what makes for a modern society and since we continue to live in such an arena, obesity is susceptible to escalation (Maziak, Ward, & Stockton, 2008). This is vital to keep at the forefront of the mind during such a discussion because it is no longer an option to push obesity off to the side; rather, it is important to understand the roots of it and how best to minimize the cause and its effects. The current way of life dictates the rise of such an epidemic and although many of the advancements are beneficial to the improvement of our quality of life, it is also damaging. Without incurring the appropriate balance between the stresses of work and the demands of modern life and the ability to be mindful in everything you do - this epidemic will not cease to exist any time soon.

To put this into perspective, of how deeply engrained childhood obesity was as of 2007, Maziak et al. has proclaimed that "at least 10% of school-age children worldwide are overweight or obese, with the Americas leading at (32%), followed by Europe (20%) and then the Middle East (16%). Currently, 17.1% of children and adolescents in the USA are overweight, about three times the rate of some 30 years ago."

Maziak et al. (2008) discusses the obvious risks to childhood obesity in regards to health such as diabetes and cardiovascular disease but there are also other things that obesity influences such as quality of life, that is dictated by physical, social and psychological functioning. Children

are already vulnerable to all of the different stages of growing up that they're experiencing from physical changes to the development of their mind and finding their place in the world. To add something like obesity to their mix of complexities has a cost to society. These are the people of the future and if they are suffering from the prejudice and stereotyping associated with obesity from such an early age, along with adverse health, they are bound to struggle to become the blooming adults that make the decisions of our society. There is also an economic cost to the whole country that, as of 2007, amounted to $117 billion, with annual hospital costs another thing to consider (Maziak et al., 2008).

In consideration of the costs to obesity, Maziak et al. (2008) evaluates the triggers of the disease in terms of food intake and its imbalance with the appropriate amount of energy expenditure. The way the body sees food intake is as a means of survival. It is not simply the stomach that influences the feeling of hunger but rather signals coming from the stomach, intestines, fat and pancreas that go to the brain triggering a sense of hunger that results in making the person want to eat. Once you have reached a point of feeling full, the brain receives signals from the body relaying this information, cueing you to end your meal. This promotes a healthy process of eating at regular intervals throughout the day, with no hunger cues at night whilst sleeping. This is a manifestation of the homeostatic system that regulates our bodies. For too long, scientists believed that the body used the process of homeostasis to keep the calories consumed and the calories burned at a balance so as to not accumulate too much fat, and thus a minimal amount of weight gain or weight loss. The idea of homeostasis remains highly relevant in the regulation of the body's temperature and blood pressure but becomes much less significant in maintaining the body's weight. It was also presumed that weight is managed by a communication network controlled by the brain, directing key processes of the body via energy

regulation. This integrates the central nervous system, the hormonal system, the gastrointestinal tract, fat tissue, and the brain. The body works to keep all of these systems in check to maintain homeostasis and ensure that all of the body is working correctly, with no distress in sight. Although it would be logical to assume this is also the mechanism by which weight fluctuation works, the system does not always work to our advantage.

The shortcoming of this ideal mechanism is the reward system which encourages excess food intake. What does this look like? Suppose you're walking out of a restaurant you just finished a large meal in, and you pass by the dessert tray that look so delicious, how do you feel? Your mouth starts to water, and now you're craving dessert even though you were completely full just seconds before. This is the reward system in action - when you see or smell something that looks good, this can provoke the body to feel like it wants to eat, regardless of whether it is hungry or not. It is the expectation of a reward that makes a person want to indulge. This is not a simple mechanism either, it involves stimulus from the environment that prompts some sort of emotional response based off of the motivational pathways within our brain, resulting in a behavior. When you apply this reward system specifically to hunger, animals alike seem almost powerless against their need to eat. In a study done in a laboratory, for example, animals were put into a room that had an electrified floor with food placed at the end of the room, requiring the animals to walk across this floor in order to get the food. The unpleasant shock that came with each step stopped the animals who hadn't eaten in a while. But, when the reward system of the animals was activated, even the animals that had already eaten, proceeded across the floor to receive their food reward (Kessler, 2010, p.11).

The human body has been dictated to store as much energy as possible from the time of the Pleistocene era in which there was a dearth of grains and meats. Because our bodies are more

inclined to having fat reserves, there is already a force that our bodies are reckoned with evolutionarily. One hypothesis that exists as a cause of or a factor of obesity is the idea of the "set point theory" (Kessler, 2010). This theory states that at the adult phase of life, the body will maintain a certain amount of energy input and output according to a predetermined level. So, someone who's level was fixed to be at a higher point, will be fat; even if that person loses weight, their body will do its best to return to that set point by slowing down their metabolism. If this hypothesis were true, then the body would be actively fighting against itself to not lose weight and dieting would be a null effort. Such a theory would also prevent the body from weight gain, keeping a fixed range of weight by increasing the metabolism when the body has too much fat, and thus burning off enough energy to return it to the set point. This would void the problem of gaining weight - yet obesity runs rampant. This theory must thus be abandoned for another more plausible of the "settling-point theory," outlined in David A Kessler's book, The end of overeating (2010). To argue that the only factor that determines body weight is genes or the way the body has evolved over time would be leaving out two most relevant factors that affect our bodies today, environmental cues and learned behaviors. It is easy to revert to thinking that a certain individual simply cannot lose or gain weight and that they will remain at that set point forever, but the reality is that as much as we would like to think things like social media and the environment do not affect how we view others and ourselves, they do, in the same way outside sources play a role in weight as well. Thus, the settling point that dictates weight, is steered by how you eat what you eat and how accessible such food is. By this theory, one would be able to limit themselves to a point of losing weight, fabricating a new settling point. But once this person begins to forgo their newfound healthy and restricted eating habits, they will return to their old settling point and gain the weight they had lost.

This explains how dieting, in its essence, is not worthwhile. A diet implies that you are only reducing your calorie intake for a certain amount of time, but as soon as the diet is complete and you have lost the number of pounds you wanted to, the diet is of no more thought. The good riddance to the diet may cause one joy because the person looks and feels great and can resume eating as they wish, but the consequence is a shift back to the earlier patterns of eating, and a return of the lost weight. To starve yourself in order to lose weight, accomplish the task, and then assume that everything can go back to normal is illogical but that is one of the main ways in which people are trying to combat obesity. These deprivation diets are unreasonable for this reason: our body, brain, and day-to-day environment are constantly fighting against this sort of way of consuming (Wansink, 2010, p. 25).

Companies have put out millions of different kinds of pills and diet plans while the government has established the food pyramid that people should follow in terms of their eating habits on a daily basis. But, is anything really working? Are we seeing any progress as people try all of these extremes of dieting and surgery? It doesn't seem so.

Current treatments for defeating obesity exist, but they are lacking. Suggested solutions that come from institutions such as the National Institute of Health or American Heart Association are certainly valid and if followed consistently, can produce desired results; however, society makes it difficult for many people to follow such a procedure for weight loss. Our society wants immediate results with quick solutions which is why we have deprivation diets and various weight loss surgeries and medications. But the bottom line is that none of these solutions are permanent solutions if the person is not making lifestyle changes. A short term intense diet will make you shed pounds and fast, but as soon as you let off such a diet, the pounds return even faster than how quickly they left and the nutritional deprivation that comes

with those diets is damaging to the health of the body. If one continues to live in that state of a diet, chances of them falling prey to an eating disorder is very possible too, further debilitating the body. Grant M. Tinsley, a professor of exercise physiology at Texas Tech University explains the idea of intermittent fasting being referred to as "hormesis", "Hormesis refers to an exposure to a relatively small amount of some stressor, which could cause the body to adapt and become more able to deal with other stressors. This is in contrast to exposure to a large stressor, which could cause harm to the body. In my opinion, short-term fasts, such as those used during intermittent fasting, would fall into the category of the small stressors which could promote health benefits. However, long-term fasts could potentially fall into the 'large stressor' category" (Khazan, 2016). These long-term fasts, also seen as deprivation diets, are thus the opposite of a healthy resolution to being overweight.

Mainstream media has encouraged these long-term fasts and in turn diminishing quality of life for these individuals. One of such instances is in relation to "The Biggest Loser," a televised competition that involves a highly intensive diet and exercise for the sake of finding a winner of the person who can lose the most amount of weight. These class III obese individuals lost enormous amounts of weight in a short amount of time but all they were doing was spending time in the gym and cutting the amount of food they ate in half. Although the televised portion of this weight loss diet showed incredible improvements in the competing individuals, no one cared to think of the long-term harm and failure of the diet. Fothergill et. al published a study in 2016 in the *Obesity* Journal to observe the contestants of the TV show to see whether they were able to maintain their new weight and how their lifestyle and metabolism had been affected. The study discovered that the participants of the show are now forced to eat a few hundred calories less a day than those who are of similar size because otherwise, they would regain the weight they lost.

Moreover, a New York Times article (2016) on the same subject said that of the 14 Biggest Loser participants studied, only one weighs less now than when the competition concluded, and four of them weigh more than they did before the show began. Naturally, after a diet, the resting metabolism is compromised, but over time for these contestants, their metabolisms became even slower "as if their bodies were intensifying their effort to pull the contestants back to their original weight" and the pounds lost turned to pounds gained (Kolata, 2016). This study has led to a better understanding of bariatric surgery, another weight loss strategy, that reduces the size of the stomach and alters the small intestine, permitting you to eat a smaller portion of food and liquid while also amending the calories and nutrients absorbed in the body. This can consequently improve many health problems but does it sustain weight loss? Again, the answer is no. Rather, it is just giving you a head start after which one must adapt healthy habits of consuming fewer and more nutritious calories while also becoming physically active. The researchers want to take this new information about resting metabolism and create a new sort of weight loss drug that targets this problem but this will just be another cycle to get trapped in?

In the journal article, An Analysis of Weight Loss Articles and Advertisements In Mainstream Women's Health and Fitness Magazines, it was concluded that when articles and ads are compared, it is articles that disseminate real information about exercise and dieting whereas advertisements perpetrated potentially harmful health beliefs and behaviors (Ethan, Basch, Hillyer, Berdnik, & Huynh, 2016). When doctors address weight concerns of their patients, their intentions are not their patients' appearance, but rather the implications of obesity, such as chronic diseases that can change a person's life for the worse if not managed appropriately. Social media and other outlets of information to the public need to do real research into the repercussions of the fad diets they put out and the reasons for those diets. People think that

cutting out the fast food, soft drinks, and candy will cure it all - but in reality, that is setting up a person for disaster if they crave those foods. Just & Wansink (2015) claim, "findings suggest that there is no association between the intake frequency of fast food, soft drinks, and candy, and BMI. These results suggest that focusing solely on restricting consumption of these foods for weight loss may be ineffective. A more effective weigh loss strategy could focus more on reducing the total calories of food eaten and frequency of snacking."

The impact of obesity does not just end with the physical nature of the person in whom it has manifested - it permeates in all realms of the person's life. An article published in the Journal of Public Health in 2005 concluded that people who suffer from obesity showed significantly lower health-related quality-of-life (HRQL) scores in comparison to those classified as of normal weight (Jia & Lubetkin, 2005). These low scores were comparable to those with people with diabetes or hypertension. HRQL is measured as self-reported effects of a medical condition that can impair the physical and mental well-being of a person. This is a necessary study because obesity is a disease that is influenced by and effects physical, emotional, and mental aspects of a person, leading to self-imposed limitations on how one can conduct their daily activities. The average obese person can receive lots of derogatory comments that make the hurtful thoughts they have about themselves even more unbearable. Children who suffer from obesity experience stigmatization in schools and end up being socially marginalized. But regardless of the age group, the feelings that accompany being fat are those of depression, more stress, hesitance to seeking out medical care, discrimination in the workplace, and much more. The result of this emotional burden is an increase of binge eating - all going against the prescribed solutions to managing weight gain. But even those solutions are not working as understood by how difficult

it can be for one to stick by a regimen without finding it overly burdensome, difficult to maintain in the reality of life, and damaging to nutritional value in some cases as well.

Obesity is a serious condition that can result in life altering changes to the body and thus there must be a new and adaptable way of living that can encourage a way for people to take control of their weight and overall wellbeing.

Chapter 2: Why Do We Overeat? What's the problem? It's Called Mindless Eating

Eating is a necessary part of survival but survival requires only so much. Too little food results in an eating disorder that doctors recognize as something that is treatable; it is visible to the eye as the person thins out further and further or they refuse to touch their food. However, there is another genre of people who experience the opposite - they just cannot stop eating, even way past the feeling of being full. They keep indulging in the food, even when they know they should stop. This is not your everyday disorder but it is a problem that almost a third of the American population has, as evidenced by the obesity epidemic all around us.

Since eating is seemingly vital for our bodies to function, our bodies should also be able to acknowledge when we have reached our quota of calories for the day, and it does know that. Our bodies recognize when they are full and in need of no more and have from the beginning of humans but something has changed over time that is allowing us to surpass such a limit imposed by our bodies. "Everyone - every single one of us - eats how much we eat largely because of what's around us" (Wansink, 2010). Our environment and the way we create a masterpiece out of the art and science of eating is what dictates why and when we eat and snack. This sort of environment consists of "family and friends, packages and plates, names and numbers, labels and lights, colors and candles, shapes and smells, distractions and distances, cupboards and containers. This list is almost as endless as its invisible" (Wansink, 2010). The key word here is invisible. The invisibility of this list is what makes it our biggest enemy. It is not our real hunger that preys off of this list but rather just the influence of all of these things accosting our senses. There is no way to avoid our environment continuously, but something must be done to obliterate this treacherous relationship between person and food. "The funny thing about eating endless amounts is that it's illogical, because the feeling is momentary…you can create one more

moment of a good feeling, but it never lasts" (Kessler, 2010, p. XX). And because it never lasts for too long with one bite more, many people continue to *keep* eating more.

What is it that our bodies are getting when they eat, snack, or overeat? Large companies have had the means of conducting brain scans for the purpose of understanding how the brain reacts neurologically to certain foods, especially (Moss, 2013, p. XXVII). Our bodies crave sugar. Before it was thought that the tongue was made up of 5 distinct parts of the tongue and that each were more receptive of a certain type of taste. Sweet was said to be recognized primarily from the tip of the tongue. This was the work done by a German graduate student in 1901 but in 1970, researchers began to realize how sweetness is not just limited to the tip of the tongue, but rather rages over all of it (Moss, 2013). "There are special receptors for sweetness in every one of the mouth's ten thousand taste buds, and they are all hooked up, one way or another, to the parts of the brain known as the pleasure zones, where we get rewarded for stoking our bodies with energy…Scientists are now finding taste receptors that light up for sugar all the way down our esophagus to our stomach and pancreas, and they appear to be intricately tied to our appetites" (Moss, 2013, p. 3-4).

It is no joke for someone to exclaim that a food looks "mouthwatering" because even just looking at a sugary treat gets the saliva going in the mouth and in turn triggers the microvilli on the taste buds and allows the mouth to process the signal it is getting from the food to send to the brain via neurotransmitters. In the brain, the signal finds the pleasure centers and marks this food as super sweet and delicious. Although this process occurs in every person, regardless of age, there are certain cues that make children even more attracted to sugar. According to Julie Mennella, a biopsychologist at Monell, kids are growing fast and thus their bodies pine for food that provide a burst of energy and this is easily accomplished by sweet foods (Moss, 2013). The

second point he makes is that evolution did not accommodate for very sweet foods for humans; thus, when people consume sugar, they undergo feelings of heightened excitement. Sugar is a feel-good substance for everyone (Moss, 2013, p. 15).

How do people choose the foods they eat if they are under no restraint? They select based off of what they presume or know the taste of the food to be because they are also aware of "the signals of pleasure their brains will discharge as a reward for choosing the tastiest foods" and how satisfying it will be to consume that food for all of their senses (Moss, 2013, p. 11). It is with this knowledge that the concept of the "bliss point" was uncovered (Moss, 2013, p. 11). This is the optimal level of sensory pleasure that can be achieved with just the right amount of each type of ingredient in any food or drink. By achieving this bliss point, companies can reach the satisfaction of their consumers by satisfying their taste buds completely. But it is not just the deliciousness of the food, it is also what cues are associated with eating it – a pleasure response that motivates us to reach for the food, and thrive off the urge called “wanting” (Kessler, 2010, p. 32) If the food that creates such a feeling is placed in front of you, the natural tendency is to use great vigor to pursue the food and garner that expected reward. This is no “one time” vulnerability to the cue either – rather the association gains strength with every encounter of the food. This creates a determination for getting the food, leading to an increase in consumption of the food that is to be high in sugar, fat, and salt content. From this, the motion to reach for the alluring food becomes a habit as the cycle of cue-urge-reward sets in place (Kessler, 2010, p. 32).

In the brain, each tempting food that is the perfect balance of sugar, fat, and salt, stimulates neurons that are what store information, create feelings, and control behavior. Those neurons subsequently create circuits through which communication of that sort is conducted

through. These neurons respond to the foods the body has already associated itself with by firing electrical signals that release chemicals in the brain that travel to interconnected neurons, firing up more and more neurons (Kessler, 2010, p. 35). The brain has sequestered some neurons that are specifically encoded to respond to singular characteristics of food incited by unique senses such as taste or texture or smell. This exacerbates the situation when the neurons specific to sucrose are overstimulated, calling on the taste buds propensity for sugar, the neurons encoded for sugar, and the reward center's pining for sugar. The result is increased consumption of the highest caloric foods.

Taste in particular is hardwired to certain brain cells that lend to pleasure, one of the strongest emotional responses we experience. The neurons tied to taste are part of the opioid circuity, better known as endorphins, that are chemicals produced in the brain known to have rewarding effects. For a better idea, the same rewarding effects that are what drive us to the pantry each time, are also those associated with drugs such as heroine and morphine (Kessler, 2010, p. 37) So not only is food seen as a means of inciting a feeling of pleasure, but it can also relieve pain or stress.

There is a significant emotional aspect of eating because food can be seen as a part of the intricate reward system. Studies show that after experiencing a stressor, consuming palatable foods actually does reduce signs of stress and anxiety (Singh, 2014). Food consumption is associated with reward and gratification because it leads to an increase in dopamine production, which is responsible for activating the reward and pleasure center parts of the brain. Even though opioids are what associate food with its pleasure and incite eating, it is the dopamine release that actually compels us to eat the food. The result of this is that many people begin to recognize which food produces a positive feeling for them and consequently encourages that individual to

repeatedly eat that food, creating a distinct behavior of pursuit-and-acquisition in order to feel that sense of pleasure again. Over time, "this type of repetitive behavior of food intake leads to the activation of brain reward pathways that eventually overrides other signals of satiety and hunger" (Singh, 2014). Thus, in a society of high stress and emotion like that in which we live now, creating such a gratification habit leads to overeating and potentially, obesity, because of our focused attention for the most salient stimuli. There are many theories about obesity that suggest the cause of overeating is the person's inability to perceive their hunger, satiety, and physiological state; consequently, they continue to eat to reduce the emotional discomfort and anxiety that is within them but incomprehensible to them (Singh, 2014). It is common for one to say they are feeling down and are in need of "comfort food" to relieve themselves of their negative feelings because in the short-term, their bodies become free from their depressed mood state. However, negligence of the cause of such a mood state and continued vulnerability to such feelings can lead to chronic consumption of these "comfort foods" that are always high in fat, salt, and sugar.

When people start to understand their inclination towards wanting to eat for reasons other than the natural need to eat, they begin to resort to dieting. Dieting can become something of more than just a nuisance; it can take over every single thought a person encounters. It is a real struggle for many to grapple with - "Sarah called herself 'fat' and 'ugly' and said her actions often left her disappointed, frustrated, and angry. 'I feel that I can't do it, that I don't have the willpower.'…'My whole thought is about why I eat, what I eat, with whom I eat…I don't like myself'" (Kessler, 2010, p. XVI). To diet in the way that society has made it seem, is not natural for our bodies and the effects of it can seep into our physical, mental, and emotional health. It becomes something that is so difficult to handle that "To those of us who love food, a diet is

pretty much “die” with a “t” on the end. (In fact, “diet” comes from a Latin word which means “a way of life” (Wansink, 2010, p. 10). Although such a statement may seem sarcastic by nature, it is that mindset that really sits on a person's mind and tries to take away the love of the food they consume and the way in which they feel about their own bodies.

Why is it so difficult for us to diet? What happens when we attempt to undergo these deprivation diets? Physiologically, our bodies already have a mechanism in place for how to take in foods and how to manipulate them for energy. We have an efficiently running system of metabolism. When there is food in our system, the body cranks up its machinery to burn the fat reserves faster and when there is less to deal with, the fat reserves burn more slowly and economically. When one deprives their body of food, the body retreats into conservation mode which slows down metabolism, making it difficult to lose any weight (Wansink, 2010, p. 27). This is how humans have survived over time in periods of abundance of food and of food droughts. With less food in the body, and the progress of losing about half a pound a week, the body recognizes this and retaliates by slowing down its metabolism (Wansink, 2010, p. 27). When this occurs, what impact does it have on the dieter? It is one of frustration and stress that can easily collapse into binge eating because as discussed before, stress hormones can signal the body to want those “comfort foods” more, resulting in a dieter giving up on their attempt to lose weight. The reward system and pleasures associated with certain types of food are engrained in the brain, thus even if a dieter is keeping herself away from those specific foods, if the stress or anxiety or negative feelings in general are not dealt with in a different way, the motivation to seek out such sugary, fatty, or salty foods still triumphs. Another key issue in the dilemma is that a diet is sought out with logic. A dieter plans out their meals, has to tell themselves constantly not to overeat any food but especially the one forbidden by their diet; it relies on rules instead of

hunger in the attempt to control consumption. In consciously denying the body of foods that the brain perceives as a way of achieving short-term happiness, the craving becomes more prominent than ever (Wansink, 2010, p. 27). If dieting is dependent on such cognitive control that is easily susceptible to cravings, then people eating in this way are becoming more vulnerable, also, to their environmental cues that are asking them to eat what is not prescribed in their meal plan. Although stubbornness is one trait, having the willpower to ignore a hunger for the rest of your life is another, and most dieters are barely even lasting a few months or years.

Dr. Brain Wansink, in his book Mindless Eating, has suggested this idea of the mindless margin, "It's the margin or zone in which we can either slightly overeat or slightly under-eat without being aware of it…If we eat way too little, we know it. If we eat way too much, we know it" (2010, p. 30). However, this is not simply about awareness. There is also a calorie range within this mindless margin from which small changes in our calorie intake slip by on a daily basis, but over the course of a year, translate into losing or gaining a few pounds. All it takes is 3,500 extra calories to add on one pound and these extra calories could be consumed in one day, one week, or over the course of a year (Wansink, 2010, p. 30). If we think about this in the other direction and were to eat 3,500 less calories, then a pound could be lost and a dieter could congratulate themselves for being one step closer to their goal. In fact, in an article published in *Science*, Dr.s James O. Hill and John C. Peters propose that by eliminating 100 calories a day from our diets, weight gain in much of the U.S. population could be contained (Wansink, 2010, p. 31). It doesn't have to be about cutting out the types of food we enjoy eating, like most fad diets do, but rather being aware of how much of those foods we are actually consuming. In this way, eating less of the foods you love allows you to still enjoy the food without the extra weight gain. This requires being mindful.

It seems that in order to be mindful, another hurdle exists, besides just the pleasure that comes out of food, that needs to be addressed: the environment. Dr. Jim Painter and Dr. Brain Wansink conducted an experiment in which they planted some clear and some white covered dishes, full of 30 Hershey's Kisses, in an office building (Wansink, 2010, p. 78). Every night after the secretaries of the building went home, the doctors checked how many chocolates had been eaten for two weeks. Those with clear dishes were caught reaching in the dish 71 percent more those with the white dishes (Wansink, 2010, p. 79). So every day, they were consuming 77 more calories which would accumulate to a full five pounds of extra weight over the course of a year (Wansink, 2010, p. 79). This extra weight was only a consequence of a candy dish on a desk. To add this candy dish, which can be found very often on many people's desks, to the other countless number of instances in which we over do the calories we should be eating in one day, means that we are truly at risk of obesity if small changes like removing that candy dish are not taken.

The well-known phrase, "out of sight, out of mind" is no joke as we are start to realize "in sight, in mind" is more real than ever (Wansink, 2010, p. 79). Simply thinking about a food can make someone salivate and want to seek out the food, but when having it in front of you, the self-control is on the edge of breaking. Wansink refers to this as the "See-Food" diet (2010, p. 81). With that candy dish sitting on the desk, each time the person approaches the desk or sits there for hours at a time, they have to make a heroic decision on whether the piece of chocolate will get the best of them or they will be able to overpower their urges. One option would be to completely eradicate the candy dish and reclaim your position of victory, or make the see-food diet something that can work to your advantage. If one were to replace their candy dish with something healthier like a fruit bowl, and that fruit is easy to see while the unhealthy foods stay

hidden, then there is no reason to be fearful of the urges one faces. Instead of punishing yourself for picking up a piece of food, congratulate yourself for choosing the healthy food. Of course, there is a limit to everything, but this is a start to being mindful of the healthier choices you start to make. The villain here is the food we see, so instead of continuously depriving yourself from the comfort food, instead remove the temptation by simply moving the food out of vision or if it cannot be moved, move around it. The idea here is that if we let food control us and our decisions, then we become a pawn to our impulses, reducing us to animals. But we have the mind to create an environment for us that is conducive to healthy eating. The choices made in the grocery store, the way the home is arranged to when and where certain foods are available to you, and acknowledging how much you have actually consumed that day will get you so much farther than simply denying yourself of your favorite foods.

Is this problem specific to Americans? How do other cultures, who do not suffer from this problem, adopt their environment to help support them instead of encourage them into obesity? The problem with most Americans and the culture we have assumed is that we eat until we are full rather than eating until we are no longer hungry. In leaner cultures, they know when to stop. In Japan, the Okinawans of the Ryukyu Islands even have an expression for when to stop eating. This expression is referred to as the concept of "*hara hachi bu* - eating until you're just 80 percent full" (Wansink, 2010, p. 34). But if that becomes a difficult comparison to make because of the vast difference in culture, let's look at those European countries like Italy and France that Americans may align with better. In restaurants in Italy, one thing to notice is a lack of soft drinks. There is the occasional one here and there but most people are drinking water rather than soft drinks or juice while Americans are always consuming them. They indulge in pasta every day while also smoking and drinking wine; however, the percentage of obese is

much less, there is less heart disease, lower stress levels, and less incidents of dementia and Alzheimer's. The French have a similar way of life but with consuming mostly cheese, bread, and wine. What is it that is in common between these two groups that makes them so much healthier and in line with their weight than us? Their cities are filled with sidewalks, trails, and parks, and little space or patience for cars. So, they choose to embrace the green space and the accessibility to sidewalks and walk to all of their engagements, allowing the calories they consume to be balanced out by their energy expenditure in transporting themselves from one place to another. The benefits are three-fold. They do not suffer from excessive weight, they do not have as many chronic diseases, and a potential causal factor for both - less stress.

Chapter 3: Where Is The Government In This Fast-Food Frenzy

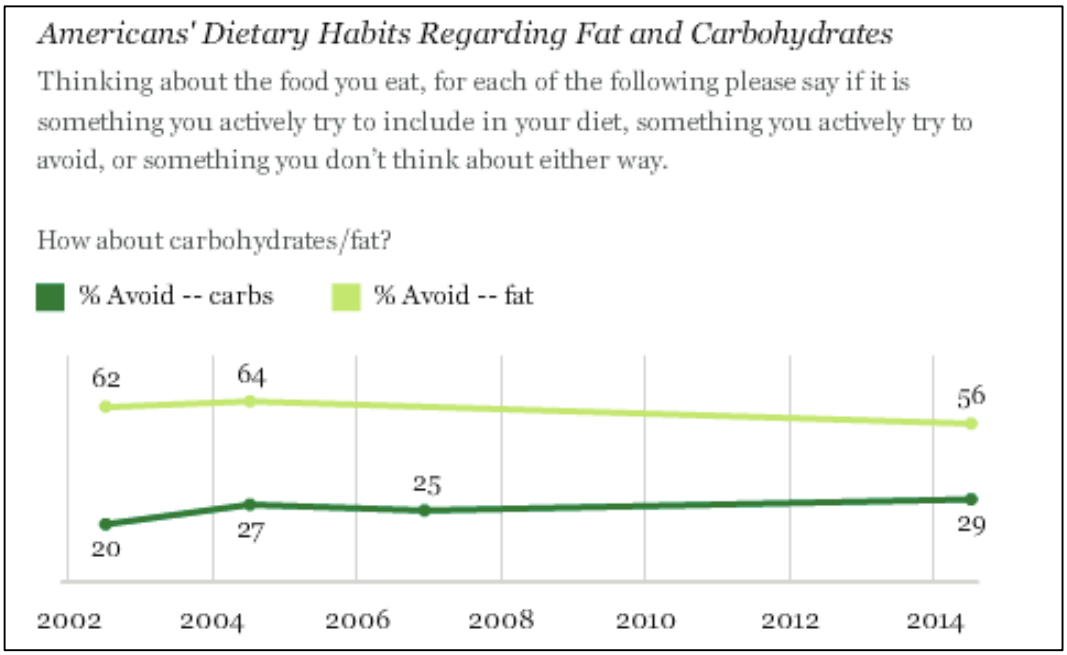
This obesity epidemic is nothing new. The people have been aware of it. The government has been aware of it. The world is frightened of it. And yet we stand on the losing side of this epidemic. The government, historically, has always taken charge of instances of great outbreaks in the country in order to protect its people; but why has little been done to eradicate obesity? What makes it different from other diseases? There have been certain steps taken to alleviate the concern but chronic disease rates are rising, the food we consume is getting unhealthier, and the people are continuing to eat poorly with lamentable eating decisions.

There are many underlying factors to this situation that has prevented the government from making much progress on this front, some more political and business-related and others with just a lack of information. From the time of the great revelation of the 1960s in which the people discovered how the sugar industry was manipulating science to make our food just how we like it, there was a shift in focus to the field of nutrition and obesity. This lent to major headway from the US government in the 1970s in regards to how the government would choose to advise its citizens on how to avoid weight gain. This proved to be the launching of "arguably the largest public health experiment in history" (D. S. Ludwig, 2016). This entailed a collective response from the US government and major professional nutrition organizations to the individuals of the country, stating that a low-fat/high-carbohydrate diet would help maintain weight, despite concerns on the lack of quality evidence used for this conclusion. The guidelines shifted in the late 20th century to encourage an increase intake of carbohydrates and decrease in consumption of all fats, demonstrative of the Food Guide Pyramid of 1992. To assist the people in getting easier access to the food products that exhibit this change in guidelines, the Healthy People 2000 goals requested the food industry to double the number of brand processed food

items that are reduced in fat. This resulted in creating more food products full of starch and sugar instead of fat. Consequently, "total calorie intake increased substantially, the prevalence of obesity tripled, the incidence of type 2 diabetes increased many-fold, and the decades-long decrease in cardiovascular disease plateaued and may reverse, despite greater use of preventive drugs and surgical procedures" from this change (D. S. Ludwig, 2016). A potential reasoning for this result may be biological adaptation. By depriving the body of fat through the implementation of a low-fat diet, the metabolic rate slows down, hunger is increased, and other starvation responses kick in and hinder the weight loss process (D. S. Ludwig, 2016). The government succeeded in bringing the proportion of fat in the American diet down from above 40% to their goal of 30%, but obesity and diabetes rates surged (D. Ludwig, 2016).

Finally, we come to the time of 2015 in which the government realized the mistake they made and proceeded to end the low-fat diet era with new USDA Dietary Guidelines. Despite this new information, the public's health is still in trouble because "the low-fat diet remaining deeply embedded in public consciousness and food policy" which is evident in a recent Gallup survey, that illustrates how a majority of Americans still actively avoid eating fat (Inc, 2014).

56% of Americans are trying to avoid fat in their diet while only 29% are avoiding carbs (Inc, 2014). There are less people trying to avoid fat now, but still not enough.



Finding the right diet is, without a doubt, of grave importance for many U.S. adults and those diets are marketed either as low-fat or low-carb. Although the information has been disseminated to the public, the attitudes towards carbohydrates and fats remain relatively the same with some shift towards a low-carb mentality.

Americans' Dietary Habits Regarding Carbohydrates and Fat by Whether They Are Trying to Lose Weight

July 7-10, 2014

	Yes, seriously trying to lose weight	No, not seriously trying to lose weight
FAT	%	%
Actively try to include	12	26
Actively try to avoid	73	49
Do not think about either way	13	24
CARBOHYDRATES		
Actively try to include	32	44
Actively try to avoid	44	23
Do not think about either way	21	30

It is certainly evident that initiatives taken by the government to encourage a healthy lifestyle works in some aspects, although some processes may take more time than others or are completely inefficient. For example, Gallup (2014) reports, "Studies continue to reveal the adverse health effects of consuming soda, and high-profile attempts to ban the purchase of large individual servings of soda or to tax it have apparently raised Americans' consciousness about drinking it, even if closer to half still consume the beverage. At this point, 13% of Americans say they don't think about soda intake, down from 24% a decade ago." This sort of progress would not have occurred without the government taking initiative to put restrictions on the buying of soda. There is no contesting that sugar-sweetened beverages, those drinks that include sodas sweetened by sugar, corn syrup, or other types of caloric sweeteners, sports and energy drinks, and other carbonated drinks are a huge contributor to the obesity epidemic. There has been an increase of 500 percent of soft drink consumption in the past 50 years; soft drinks are said to be the single-largest cause of calories in the American diet (Fitts, 2013). About seven percent of the average American's calories consumed comes from soft drinks. This may not be the sole contributor to obesity but it certainly has an impact. In response to this information, the government proposed a soda tax in attempt to dissuade people from buying sodas. Although there are opposing theories on how well such taxes would work on combatting obesity, it is a start. It would be ideal to think that simply educating the public on its negative effects would be sufficient, habits can be hard to break. According to research done by the UCLA Center for Health Policy Research and the California Center for Public Health Advocacy, adults who drink one soda or more per day are 27 percent more likely to be overweight. Another study done by the National Bureau of Economic Research (2014), discussed in UCLA's research, discovered that having a 20 percent tax on sugar could reduce calorie intake by 18 percent, consequently

reducing sugar consumption by more than 16 percent. These statistics are cases to motivate the government to keep trying, because clearly the educational method and that of dieting is failing. However, when it comes to a financial incentive or a ban, more can be accomplished.

Americans' Dietary Habits of Drinking Soda

Thinking about the food you eat, for each of the following please say if it is something you actively try to include in your diet, something you actively try to avoid, or something you don't think about either way. How about soda or pop?

	Include	Avoid	Don't think about
	%	%	%
Jul 7-10, 2014	23	63	13
Jul 8-11, 2004	25	51	24
Jul 9-11, 2002	36	41	23

GALLUP

The attempt to have the FDA provide guidance as to what to eat and how much of it to eat with things like the food pyramid was a failed one. The attempt has been made to concern people about their weight and what happens accordingly but there is a disconnect with individual behaviors and their sustainability. Why? Maybe because the question being asked of why the individual is not able to lose or maintain a healthy weight allows all of those environmental influences to get away without any blame. Rather, attention should be drawn to why it is that companies are able to get away with advertising unhealthy food to the public. The tobacco problem existed for similar reasons of the social influence and the advertising that existed. Although the people were informed about the health costs to smoking, the main change occurred when larger influences such as legislation came into play. Why is this epidemic not being treated in a similar way? "The biggest government watchdogs show no teeth when it comes to

controlling the industry's excesses in promoting surgery, high-calorie fare, not only on TV but also in the full range of social media now used by the food industry in its pursuit of kids. Moreover, the government has grown so cozy with food manufacturers that some of the biggest industry coups would not have been possible without Washington's help" (Moss, 2013, p. XXVII).

The bottom line is, that the government can enact policies and encourage the public to adapt to a healthier lifestyle in ways that the scientific community cannot. They have a power and a link with food manufactures that can go beyond simply giving nutritional counsel to the citizens and create real change for the health of the people. So, what has created this obesity epidemic over the past 40 years and how is the government and/or some other agent preventing its cessation?

We have established how much our bodies have grown to pine for salt, sugar, and fat but now it is time to understand how that has been used against us, but also with the motive of satisfying us. We have been manipulated for the sake of our enjoyment and to be profited off by one big industry - the food industry. They remain the most difficult to conquer. They control the most amount of resources. They have the best science in their hands. They remain the winners. Their way of getting to the people are of two-fold: targeting our palates through science of the tongue map and our children through marketing.

Marketers understand that by having highly palatable food, consumers will not only choose their food, but there will also be a general increase in energy intake the better the palatability. The industry is completely dependent on the ingredients salt, sugar, and fat. Without these three, the food these companies produce is tasteless. "Take more than a little salt, or sugar, or fat out of processed food, these experiments showed, and there is nothing left. Or, even worse,

what is left are the inexorable consequences of food processing, repulsive tastes that are bitter, metallic, and astringent. The industry has boxed itself in" (Moss, 2013, p. XXIX). Palatability is controlled by food science, but the appeal for these foods is insubstantial without marketing. Perception is key here. Once a food company has produced a food that harbors the desires of the consumer, it is the job of marketing to get the food out there and know how to target more consumers. They even found a way to get around public concerns for a lack of nutritional labeling. The Nutrition Labeling and Education Act of 1990 had food marketers adding more taste-neutral positive nutrients, like vitamins, to their brands while also trying to expand their profile with healthier brand extensions of their products that use lower levels of negative nutrients. Yet despite these efforts, "the average nutritional quality of food products sold in grocery stores had actually worsened compared to pre-NLEA levels and compared to similar food products unregulated by the NLEA" (Chandon & Wansink, 2012). How did this happen? Food companies thrive on the taste of their products, not their nutrition, so the incentive to reduce levels of negative nutrients such as fat, sugar, or salt is not apparent. But, if they change a few things and market the product as a healthier food, people will not just consume it, they will overeat it because it is justified as a healthy food. Yet the result of this is simply more calories consumed, and thus more weight gained.

A class of products that profits well for these companies but not for the public's health is the afternoon snack. The downside of this is that calorie density, or the number of calories per unit of food, increases energy intake during the short period of snack time because "people prefer calorie-dense food and tend to eat the same volume of food regardless of this calorie density" (Chandon & Wansink, 2012). People no longer pay attention to the internal signals of satiation,

instead, they focus on external signals coming from their environment that allows them to overconsume.

There is no doubt that we have become a people of convenience. Taking our time to cook the necessary three meals a day, with purpose and intention, is no longer a common happening. Why? Because we are always on the run! To be sitting idle is deemed as a failure, but to always be involved and pursuing the next big thing is highly commended. This evolution of society into a high stress, very engaged, and socially driven community has taken a huge toll on the health of the people. Not only are the people at risk from their own habits, but other companies and marketers are taking advantage of the change, because that is their business. The question then becomes, is it necessary for food marketing and the way food companies are adapting the food they sell to us, to be detrimental to our health? Do they need to make us fat?

The first thing to understand is what is marketing. Many just assume it is a way to catch as many people as possible by the evil methods that companies have learned in terms of targeting our deepest desires. But if we look at the true definition of marketing, provided by the American Marketing Association, it can be defined as "the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large" (Chandon & Wansink, 2012).

The people want foods that are tasty but also cheap and convenient, enabling us to eat in large quantities. "By catering to, and stimulating, these biological interests, food marketers have been accused of contributing to the growing problem of global obesity" (Chandon & Wansink, 2012). It is one thing to say that food companies are simply advertising to us, but it is another for them to manipulate our desires into types of food they want us to consume. Over time, our taste buds have required more sugary foods, not because of a propensity to self-harm, but rather

because food companies have found a way to make us want it more. The marketing of a food company includes "advertising, promotion, branding, nutrition, and health claims, can influence a consumer's expectations of the sensory and non-sensory benefits of the food" as one tactic (Chandon & Wansink, 2012). Another is the product itself and how it is composed with just the right amount of each ingredient to reach that bliss point that makes it difficult for one to put the food down. This marketing scheme also makes people vulnerable to the quantity of the food - the more the merrier. The last main mechanism used by food marketers is the eating environment which includes convenience of the food, its availability, and its salience.

Using these mechanisms, food marketers introduce a product to the market and make the population aware of the brand. In the beginning, the emphasis may not be so much about what the food itself is, but rather establishing the brand and making it stick in a person's head. Once this brand and its product is in the head of the consumer, it encourages them to seek out the brands they recognize, removing any incentive for them to try new foods, and "rather than the brand that would have the highest nutritional and hedonic qualities" (Chandon & Wansink, 2012). Consciously and subconsciously, consumers are looking for what they have already been introduced to before even stepping into the grocery store, eliminating competition from potentially more nutritious and better foods. Consumers are prepared to encounter food that more than satisfy their expectations because "communication enhances a consumer's expectations of the sensory and non-sensory benefits (such as the social and symbolic value) associated with the purchase and consumption of a particular food" (Chandon & Wansink, 2012). Regardless of if it establishes any benefits to consumption, such communication can make a person forget any heath goals they have and make taste a bigger priority, destroying a person's level of will power for making healthy food choices (Chandon & Wansink, 2012). With such high obesity rates in

the country, one would surmise that people would be inclined to protect themselves from the allure of unhealthy foods that leads to the perils of chronic diseases. History, however, doesn't always seem to prove that statement to be true. For example, in 2010, PepsiCo initiated a campaign to advertise its line of better-for-you products. This prompted a sales drop that caused Wall Street to demand the company abandon this line of products. Instead, they ordered PepsiCo to return to "its core drinks and snacks: those with the most salt, sugar, and fat" (Moss, 2013, p. XXIX). Although it is the individual's choice in the end, much of the decision is attributed to marketing techniques that have made certain foods so appealing that people are not making nutrition the first driver in their food preferences because food marketers have succeeded in changing their goals from nutrition to taste.

Delving deeper into the concept of branding allows us to see the multi-level effects of the creation of such "names, symbols, characters, and slogans that help identify a product and create unique positive associations which differentiate it from the competition and create additional value in the consumer's mind" (Chandon & Wansink, 2012). When someone gets an unappealing or mundane description of a product, they are not inclined to buy it. But food marketers know better. Competent companies recognize that simple but inviting descriptions "can influence taste expectations, consumption experience, and retrospective evaluations of the taste, and then lead to increased sales, especially for non-experts" (Chandon & Wansink, 2012). Taking it one step further is when those companies then try to frame the nutritional content of the product to be more conducive to what the public views as "healthy" at the time. For example, when a food is labeled with "50% fat-free" versus "25% fat," consumers reach for the food that is perceived to be leaner and of higher quality, the former choice (Chandon & Wansink, 2012). These decisions are even more intense when evaluating them from the perspective of the sensory experience

which branding heavily influences. "In fact, marketing descriptions of a milkshake as “indulgent” or “sensible” influences physiological satiation, as measured by gut peptide ghrelin. Neuroimaging studies confirm that these marketing actions influence not just self- reported liking, but also its neural representations, suggesting that these effects are not merely influenced by social cues and that marketing actions modify how much people actually enjoy consuming the food" (Chandon & Wansink, 2012).

As crafty as these techniques are for targeting adults, what’s even more devious is the art of food advertising directed at children. Nowadays, children spend lots of their time focused on the television, watching their favorite shows. As easy as it can be to leave your child at the TV to let them enjoy their shows, what people do not realize is what the advertising companies are doing during those shows. This age group is still learning to process the messages being portrayed in such ads, leaving them vulnerable to the simple messages they can interpret from them. That lack of ability to analyze the claims "can lead to consumption by reinforcing and normalizing behavior, prompting initial use, and rewarding continued use" while "equat[ing] food with fun and happiness in order to generate brand loyalty in very young children, even if it does not generate immediate sales" (Maziak et al., 2008).

Children are still forming their opinions and their thoughts on everything around them. It is at this stage of life that they are most vulnerable to all of the advertising that comes their way. So, in the process of forming their preferences and their loyalty to certain foods or food groups, food marketers can easily catch hold of the young kids, and potentially capture them for a life time. Studies attest that of the advertising presented in children’s TV programs, one-third is representative of food advertising which exposes children to 40,000 food ads a year that are

composed of "unhealthy foods that are high in fat, sodium, and added sugar" (Chandon & Wansink, 2012).

"It's not that food companies are teaching children to like sweetness; rather, they are teaching children what foods should taste like. And increasingly, this curriculum has been all about sugar" (Moss, 2013, p. 15). The ramifications of this is the exploitation of the biology of the child. By capitalizing on the child, the food industry is restructuring the child's threshold for the sweetness and saltiness of the palatability of food (Moss, 2013, p. 16). This is transforming the norm for children and creating a different standard for what is healthy and reasonable to eat, when in reality it is way over the limit of what is considered to be healthy.

The impact of this is seen within all ages but when the crisis hits the children, it infiltrates into their adult lives as well, leading to chronic illness that can become difficult to maintain. Childhood and adolescence is the time in which they begin to make choices and get accosted by media and social and environmental influences that shape who they become. Food companies know that, and that is why they are winning.

Chapter 4: "all gasoline, no brakes, and no steering wheel,"

(B. J. Casey and Kristina Caudle, 2013)

Obesity does not choose one age group or another but the age of adolescence is one of vulnerability to which obesity can thrive off of. The first task is to try and define what an adolescent is. There are many ways in which to define an adolescent. One is the age group which American Psychological Association categorizes as ages 10-18. However, it is important to take physical, social, and cognitive development into account here in conjunction with age and realize that the needs and capabilities differ for each adolescent in this crucial time of growth (Suleiman & Dahl, 2017). The onset of puberty involves more attention to and salience of social and emotional information. This is reflected in social relationships as well as understanding the self, figuring out one's place amidst social hierarchy, and coming to terms with self-conscious emotions (Suleiman & Dahl, 2017). A concept to take caution of is how the media portrays adolescents and how people also view the teenagers in their own lives. It is not so different within the professional literature either. Adolescence is, at many times, seen as a negative stage of life, where a time of stress is to be underwent and endured ("Developing Adolescents: A Reference for Professionals," 2002). There is a peak in their criminal activity and many psychiatric episodes that can occur during this time of development (Casey & Caudle, 2013). These situations definitely occur during the time of adolescence but they should not define it and subsequently categorize adolescents as incapable of rational decision making. This sort of conclusion about adolescents forgoes much credit that they deserve in light of all of the changes they are experiencing both physically and emotionally that need time and nurturing in order to foster. Although there is a negative connotation even to just the word teenager, a 1999 survey done of the general public by Public Agenda also stated that 89% of the respondents believed

that "almost all teenagers can get back on track" under the influence of appropriate guidance and attention (“Developing Adolescents: A Reference for Professionals,” 2002). This is indicative of what adolescents are capable of, beyond what they are perceived to be.

First, it would be beneficial to break down the parts of the teenage brain that can be questionable for some in terms of their behavior, but does not have to be. Self-control is a huge concept in this regard. Adolescents demonstrate heightened sensitivity to socially relevant cues which can prove to be helpful to them or can work at the expense of long-term goals they may have, while also inhibiting their overall well-being (Casey & Caudle, 2013). Their impulses to emotional and non-emotional contexts are relevant in determining how strong or weak their self-control may be. Data drawn from Hare et al. (2008) and National Research Council (2011) formed the conclusion that both contexts perform uniquely. When no emotional information is involved, adolescents exhibit performance that is just as good, if not better, than adults. However, when placed in a context of emotional cues, adolescents falter in their control because they have difficulty suppressing their impulses to provoking social cues versus neutral ones (Casey & Caudle, 2013). This does not conclude that there are no moments in time where teenagers can act rationally, but rather in times of heated situations, their behavior tends to the less rational side; yet, in times of less emotional cues, decision-making is still at a prime.

Some question the teenage brain and how much it could really be developed if their behavior is seen as insolent and negligent of what is deemed appropriate behavior. Scientifically, there is a response to this that explains much about the decisions adolescents make. The area of the brain dedicated to the concepts of self-control and rational decision-making is the prefrontal cortex which is present since birth but undergoes much of its development during the time of adolescence. This change involves strengthening the connections within the circuitry of the

prefrontal cortex, granted they begin understanding how to adapt to the demands of their environments. A theory that then further explains adolescent behavior is the *imbalance model of brain development* (Somerville & Casey, 2010). This model claims that the reward-related subcortical regions of the brain interact differently with the prefrontal control regions during the course of development. Before prefrontal control is established, motivational and emotional subcortical connections form and thus make adolescents rely on their motivational subcortical regions. Adults rely more on the prefrontal regions since their circuitry is refined by that period of time, "providing a mechanism for top-down modulation of the subcortically driven emotional behavior that increases the capacity for self-control" (Casey & Caudle, 2013).

The next thing to understand about teens is self-regulation. This is "the ability to resist the temptation of an immediate reward in favor of a larger reward later, known as delay of gratification" (Casey & Caudle, 2013). People's behavior is representative of their ability to sort out environmental and genetic factors in the brain that then allows them to accommodate the demands of the ever-changing environment. Mischel, Shoda, & Rodriguez (1989) created a paradigm studying self-regulation in young children. Mischel et al. (1989) designed the experiment such that the children would be given the option to either choose a small reward of one marshmallow sooner, or wait longer for a larger reward of two marshmallows. If a child chose to eat the smaller treat, they were considered to be low delayers, or if they waited longer for the larger reward, they would be classified as high delayers. In a 40 year follow up to this study, Mischel et al. (1989) adapted the delay-of-gratification task to be more age appropriate for adults and used a neutral and more emotional cue, and social cues such as happy versus neutral and fearful faces, to create a task that would evaluate the adult's ability to suppress habitual responses to emotional or neutral cues. The results demonstrated that 40 years later, those

participants who felt the need to eat the marshmallow immediately, still had trouble repressing their responses when a positive social cue was given, even though they were directed not to respond (Mischel, Shoda, & Rodriguez, 1989). This means that the difficulty in delaying gratification that existed at age 4, continued into age 40 with persistent reduced self-control (Mischel et al., 1989). However, poorer performance was evident when the individual had to suppress a response to an appetitive social cue and showed more struggle in those situations. A conclusion to draw from these findings is that the type of environmental cue that an individual is faced with dictates their ability to apply self-control and restrain themselves from certain inappropriate actions that lends to unfavorable behavior. This presents more of a problem during the age of adolescence. If an individual is bound to harbor less self-control, but is currently exhibiting the developmental period of adolescence and have an enhanced sensitivity to emotional and environmental cues, their ability to rationalize is greatly hindered and makes them susceptible to the way in which entities, such as junk food companies, can choose to manipulate our audience.

That vulnerability to manipulation can be characterized in another way - through the immediate hedonic reward of succumbing to temptation. Adolescents have a tendency to enjoy this reward and fail to think of the long-term outcome of indulging in said temptation. When exploring the function of eating, there are two methods that can be claimed that lead one to food, unspecific to age: the homeostatic regulation of hunger and automatic hedonic processing of food cues. In front of the obesity epidemic, it may be possible that self-control that exists via homeostatic regulation is forgone and replaced by hedonic processing instead. Those hedonic responses are the pleasant sensations that drive a person towards tempting food cues, the generation of food cravings, and neglecting the long-term dieting goal that one may have. To

account for such responses, Hofmann et al. (2010) suggests that the two factors of pre-exposure and the time course of hedonic responses be evaluated. People, especially dieters, are found to be more likely to overeat following exposure to the sight, taste, or smell of tempting food cues. These inviting food cues can also include different words that are associated with enticing foods, increasing attentional bias for such foods. Attentional bias is best described as "the propensity to look for, and be attentive to, certain information in the environment (Posner & Petersen, 1990). This sort of inclination towards temping foods can thus temporarily shut off control of a person's goal to eat well and in moderation. What this implies is that someone who is mindfully trying to eat well, like a dieter, may not always be under the threat of hedonic responses to food but rather is more so during a "hot state" presented by tempting food primes (Hofmann, van Koningsbruggen, Stroebe, Ramanathan, & Aarts, 2010). Another question of concern when evaluating the eating domain is what happens to the mental apparatus over a period of time, post a hedonic affect? One option is for iterative hedonic processing to preserve or magnify the hedonic responses if attention remains locked to the affective information that created the response to begin with or simply the process initiated to end the response. The second option could be that the response is down-regulated over time through mechanisms that allow the psychological system to disconnect from the tempting food cues.

Hofmann et al. (2010) implemented a study to evaluate these mechanisms of eating. The results of this study demonstrated that without pre-exposure to food, dieters underrate palatable food primes well even during short periods of time. The implication of this is that implicit self-control seems to be the default for dieters which is a surprising finding because the assumption is always that an obese person or one on a diet would be struggling to control their impulses for palatable foods. Yet, this observation of showing elevated hedonic responses for dieters, that

continued over time, to the palatable food primes, was only evident when there was pre-exposure to these foods. Thus, the conclusion to be made here is that giving a dieter the exposure to enticing food prompts a state in which the individual is hyper sensitive to the hedonic features of food. This directly ties back to the environmental stimuli mentioned throughout the paper. With the environment that we have created for ourselves in this country, it is natural that those who are trying to maintain their weight would find it incredibly difficult to not pull into a fast food restaurant and fulfill their hedonic impulses. Now to take this idea of hedonics and apply it to adolescents who are already in a sensitive state of mind due to their development, the results could be and are drastic. They are already at a time where self-control is not completely developed and environmental stimuli is the only remaining factor to keep them sustained, and thus, adolescents have little support – the fast food nation we have become maintains pre-exposure to the cues that can only make adolescents succumb further to choosing the unhealthy food choices.

In the process of self-regulating, adolescents are developing their idea of autonomy. Everyone encounters teenagers who refuse to acknowledge what their parents or elders ask of them. They want to be entirely independent and thus, they are sensitive to any perceived encroachment on their autonomy. Adolescents respond to an adult's attempt to control their behavior by either rejecting it entirely, ignoring the request, or in some cases, sanctioning the opposite behavior in order to regain their autonomy (Bryan et al., 2016). This can be seen in studies done that frame the request being made at an adolescent in different ways. In one study, by formulating the request using "should" instead of "might consider" towards an adolescent's behavior, prevented them from internalizing the message or enacting any change (Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004). Another study presented adolescents with video clips of

their mothers telling them different ways in which they want their child to change their behavior. In this study, they tracked the neural activity of the adolescents to find that the adolescents were not processing the criticism nor considering adjusting their behavior based off of what their mothers were saying; instead, they just felt angry (Lee, Siegle, Dahl, Hooley, & Silk, 2015). This indicates that teenagers usually do not like to be told what to do - their desire to be autonomous serves as a barrier to an adult trying to influence the choices they should be making. Thus, when an intervention is being conducted on them but they already refuse to internalize the messages being delivered on what sort of personal choices to make; for example, with healthy food choices, it can be assumed that adolescents will not appreciate or follow such guidance. This does not mean we accept defeat to the stringent nature of a teenager to do as they please, rather it is important to find a way to use that sense of autonomy to benefit both the one with guidance and the one receiving it.

Adolescent development research recently presents evidence of an increased concern for social justice during this period of development. The stereotype for teens is that they are selfish in nature and only look to short-term aims that benefit themselves, yet there is more to them. This is a time for adolescents to transition from childhood, in which they were told how to be and followed these instructions, to adulthood, where they begin to become independent from their parents and can pursue their own interests. Amongst those interests are those of social justice and beyond-the-self aims that are characterized as social movements dedicated to topics such as vegetarianism or nationalization or the environment and more (Yeager et al., 2014). In the brain, this appears as neural and endocrine system developments that result in increased attention to unfairness along with a need to find meaning in life and purpose in the actions we take. The way this manifests into adolescent behavior is with high reactance in opposition to the

authorities in the individual's life (Bryan et al., 2016). Adolescents, in many cases, associate the unjust behavior occurring to be aligned with adult authorities, causing them to want to be against those figures and their beliefs. However, it does not always have to result in oppositional reactance; these attitudes toward societal unfairness can manifest with a general condemnation that encourages the individual to take prosocial action in order to change the state of the unfairness transpiring (Damon, Menon, & Bronk, 2003). In harboring the idea to have substantial impact on the world, that does not have selfish aims, can be reflective of the feelings associated with eudaimonic reward in the short term (Yeager et al., 2014).

Bryan et al. (2016) created a mechanism designed to use an adolescent's inclination toward social justice and autonomous behavior by creating a treatment that allows them to take control of their eating habits through such values. The experimenters hypothesized that healthy eating would be made to seem as a status-enhancing behavior and thus encourage adolescents to consume healthier food options. The main two parts of this intervention would be to create a message to the adolescents in the form of an exposé discussing the food industry's manipulative marketing practices that are devised to dupe adolescents and others into eating great amounts of unhealthy foods. The consequent of these companies using science and engineering to manufacture foods of maximum addictiveness while making these unhealthy foods seem healthy with deceptive labeling, is overconsumption and eventually, the obesity epidemic that resides in the U.S. By using this information and disseminating it to the adolescents of this intervention, the idea is to portray food marketing companies as adult figures who are trying to control these teens, inciting the teens to rebel against this power through the avoidance of junk food. The second proposed mechanism for creating healthy eating habits is to beckon the social justice tendencies of the adolescents by enlightening them on how the industry's practices are producing

social justice consequences that cannot be ignored. Thus, healthy eating would be pictured as a way to stand up for the vulnerable social groups being manipulated by this industry and who are unable to shelter themselves.

The psychology of the adolescent that is outlined in this chapter explains why junk food companies are willing to invest millions of dollars into advertising to children at a young age, but also still adolescents who are able to hone into those implicit attitudes towards junk food and become significant consumers of the food type. The positive associations to certain brands and junk food is established early but amplified when adolescents take control of their decisions and feed off of the drive to be their own person, doing as they wish, fulfilling the marketing scheme the food industry thrives off of.

Chapter 5: Can Associations Towards Food Change?

There is a massive availability of junk foods all around us. That mass of food is especially targeted at children from an early age by junk food companies who use the dangerous tool of strategic marketing to initiate the public's inclination to their foods. Unknowingly to the people, these companies are creating positive associations to their food, ensuring that the temptation to reach for unhealthy food is in them implicitly – without conscious awareness. These implicit attitudes exist without one ever questioning why they think that way; for example, some people love blueberries but hate blackberries, and they have no idea why they feel such a way. Many external and internal factors contribute to these attitudes that manifest in a person's behavior. However, these strong positive associations to junk food, fashioned by the food industry, have never been measured to ensure their validity and their strength.

Explicit measures in an intervention are always seen as effective measures of evaluating a person's attitudes to the topic being presented. Explicit attitudes are considered to be "conscious evaluations of the attitude's object" (Echebarria Echabe & Echabe, 2013). These self-reported evaluations are deliberate reactions to presented stimuli (Czyzewska, Graham, & Ceballos, 2011). However, recently, psychologists have taken keen interest into another construct - implicit measures. The implicit response to an object would be "affective automatic reactions aroused by encounters with an object" that can be "shaped and changed via associative processes" (Echebarria Echabe & Echabe, 2013). These automatic affective associations can be a variety of interactions such as images, environmental cues, words, and more. What makes these implicit associations is that they are often out of reach from conscious monitoring and intentional regulation and they are reflected in immediate responses to some attitude-relevant stimuli introduced to the subject (Czyzewska et al., 2011). Studying both implicit and explicit attitudes

would be most relevant because as people experience new life events and add layers of newly formed attitudes on top of what they already believed, it can be difficult to garner the actual beliefs of that person. People can and do exhibit multiple feelings towards one topic at the same time because of the multi-faceted nature of everything we encounter in life; there are so many influences targeted around each topic that amount from a gamut of contexts. When people introspect then, they call on the most current attitude they have acquired which may not be exactly how they feel. The explicit system of attitudes towards something can easily change and is subject to a more context-independent structure but the implicit system, though highly contextual, "only changes in an enduring way after considerable time, effort, and/or intensity of experience" (Devine, Forscher, Austin, & Cox, 2012).

As discussed throughout the paper, environmental stimuli may be a much larger component of obesity than thought of before, thus making it a reasonable task to regulate how one responds to their environment. There are two different systems dedicated to making the decision to consume food - the impulsive and reflective systems. The system that people use to respond to such stimuli is the impulsive system and implicit attitudes are then categorized as the evaluative component of said system. "These automatic evaluations result from spreading of activation through a network of associations in a memory system, triggered by encountered stimuli and linked to spontaneous behavioral tendencies of approach or avoidance" (Czyzewska et al., 2011). The reflective system, emulative of explicit attitudes, entails intentional control and attention to behavior that reflects long-term goals and personal standards. Of these two systems, when a person experiences an impulse to reach for the dessert, for example, it takes control of the reflective system to keep from consuming the dessert. The impulsive system, on the other hand, reacts to environmental stimuli in a way that is steered by motivational states.

Another way that focusing on the implicit attitudes a person has towards eating is because of the discussion found in Chapter 4 on hedonic reactions. Most research has been dedicated to explicit measures in studying dieters and normal eaters to determine the effect of palatable food stimuli through self-reported evaluation. However, the results related to such studies do not show correlation that would make sense in accordance with those individual's actual eating habits. Thus, many researchers now believe that because the nature of a hedonic reaction is of spontaneity and automatic processing, an accurate way to measure these tendencies is through indirect measures. Yet for those who have studied just indirect measures have also struggled to get conclusive evidence on hedonic processing, only very mixed results. To correct this, a reasonable mechanism would be to find a correlation between explicit and implicit measurements on eating behaviors.

If adolescents vigorously pursue what, from their perspective, are the appropriate and autonomous choices they wish to make, then measuring their implicit internalized positivity associations to junk food, will presumably guide behaviors. Having these implicit attitudes measured, will allow the use of interventions to ultimately change those associations towards healthier food choices. With this information, I crafted an implicit attitude task to show the initial validation of implicit attitudes towards junk food, to be correlated to explicit attitudes towards food from self-reported measures. The data extracted on implicit attitudes would then be used to measure the results of marketing done at adolescents and through the environment created by the food industry.

Overview

Although there are many different ways to measure implicit attitudes, the one that seems most affective for studying adolescents is the Affect Misattribution Procedure (AMP). Many studies use the Implicit Association Test (IAT) which shows strong results as a predictor of discriminatory behavior and creates good correlation with parallel explicit measures. However, IAT relies heavily on reaction time, takes longer to administer, and shows less reliability and validity in comparison to AMP.

Following Keith Payne's creation and use of AMP to evaluate the implicit and explicit prejudice of racial bias in the 2008 American presidential election, I adapted the AMP procedure to then understand the implicit bias towards unhealthy and healthy foods. Payne states how explicit prejudice has become rarer in America and thus questioning people about their views on prejudice are not as helpful anymore. To combat this, he looks to implicit prejudice to see the associations that one makes and is not conscious to, in regards to different racial groups, to see what role prejudice may have played in the elections. From a meta-analysis of studies on racial bias, Payne noted that the use of "implicitly measured prejudice was more predictive of behaviors and judgements than explicit measures were" (Echebarria Echabe & Echabe, 2013). Because there are still some hesitations in terms of using implicit tests to evaluate prejudice, Payne uses both implicit and explicit measures to comprehend the relationship between the two.

AMP Task Development	
Picture Selection	1) Established primes of AMP task to be healthy foods and unhealthy foods 2) Chose pictures of healthy and unhealthy foods based on food brand logos common to those targeted at adolescents as well as what the adolescents see in their cafeterias 3) Sorted through the collection of pictures found to select most relevant to the primes
Picture Rating	1) The chosen pictures were shown to research assistants on the team to rate the pictures and make a final decision on most reasonable and relevant healthy and unhealthy foods to use in the task
Write the script	1) Using a basic AMP Inquisit script, I manipulated the code to incorporate 50 images of healthy food, 50 images of unhealthy food, and 50 images of food specific to the cafeteria of the school at which the task was run; target images of Chinese pictographs were also included 2) Time of each trials was kept to a standard 3) Instructions that were to appear at the start of the task were crafted and included in the code
Programmed the task	1)Task was piloted to research assistants in lab to make sure the timing of each trial is appropriate for 8th graders to be able to manage and to make sure there are no glitches in the set-up of the task
Pilot of the task made to work on computers and iPads	AMP task ready to run at school

Method

Sampling

I investigated implicit attitudes towards unhealthy food by recruiting 8th graders at a school in New Braunfels, Texas who would participate in the AMP task. The sample size was aimed for about 175 students but the resultant sample sizes for Day 1 of running the task was 58 participants and 120 participants for Day Two, which occurred one month later.

Implicit Attitudes Task Creation

Using this as a model, and Payne's extensive analysis on the reliability, validity, and mechanisms of AMP (2014), I made an AMP task appropriate for evaluating implicit bias towards unhealthy food. The AMP task always begins with a prime stimulus that flashes on the screen briefly. I chose to use two primes - an unhealthy food prime and a healthy food prime - along with an additional prime of cafeteria foods, and a target image. For the unhealthy foods, the images of choice were brand logos and real advertisements of junk foods most appealing to adolescents such as Coca-Cola, Cheetos, Doritos, Gatorade, Oreos, and various cereals. These particular images were chosen after great research into what are the brands that act as the biggest contributors to junk food advertising aimed at children. The cafeteria prime images were taken by collecting cafeteria food data from the school at which we conducted the study and extracting foods that are healthy and unhealthy to include in the task. The healthy food prime consisted of appealing pictures of fruits, vegetables, nuts, water, and other options that are widely accepted as healthy. In total, there were 150 trials, with 50 images per category of unhealthy, healthy, and school cafeteria specific foods. After the prime image leaves the screen, the next to appear is the target item. The purpose of this item is to have an image that is "ambiguous with regard to the judgement made about it" (Payne & Lundberg, 2014). In most cases, a Chinese pictograph is

used as the target item because most American participants are unable to read the Chinese character; but to be considerate of Asian participants, we did look into using abstract paintings, fractal shapes, or Tibetan characters since they have shown to also be successful in remaining an ambiguous target item. The target of choice ended up being a Chinese pictograph although it would be of interest to potentially explore abstract paintings or fractal shapes in a future trial since it may be more believable for adolescents, but regardless, the choice of item should not affect the AMP results. After the target item, a visual mask is displayed on the screen to keep participants from assessing the target for too long. At this point, the participant is asked to make a judgement on the target item. A binary response scale was used in this task of pleasant or unpleasant.

Payne K., and Lundberg K., (2014), The Affect Misattribution Procedure: Ten Years of Evidence on Reliability, Validity, and Mechanisms, Social and Personality Psychology Compass, 8, pages 672–686. doi:

For each trial, the following are the standard times used: 75 ms for prime stimulus, 100 ms for the target item, and then the mask page that stays until the participant responds.

It is important to note the particularities of the way in which the images appear and what instructions are given to the participants before they begin the task. "The prime and target items are paired randomly so that, when responses are averaged across repeated trials, the idiosyncratic

influence of each target item is aggregated away, leaving only the systematic influence of the primes" (Payne & Lundberg, 2014). Additionally, participants are told not to pay attention to the primes and to not let the primes impact their judgements of the target items so that any "systematic effects of the primes that persist despite intentions to the contrary are interpreted as automatic influences of the primes" (Payne & Lundberg, 2014). The way this translates into an implicit measure is that because the prime is briefly flashed onto the screen, the evaluation of said prime is spontaneous in nature and thus the response recorded from this prime must be implicit in nature. There are no additional tasks to be done to evaluate the prime; the selection of pleasant or unpleasant only occurs at the time of the mask. Also, we request the participants to evaluate the target items, not the primes, so "primes are expressed in behavior in direct contradiction of subjects' intentions to solely evaluate the target items" (Payne & Lundberg, 2014). Consequently, in theory, the AMP task relies on the automatic responses of the participants in order to get their implicit attitudes.

Explicit Attitudes Measurement

During baseline assessment of participants on Day 1, a variety of explicit attitudes were measured, some of which were specific to feelings toward being a healthy eater and to feelings associated with food advertising and consumption. The baseline attitude measures utilized for analysis here are: "I like the idea of being a healthy eater," "I want to think of myself as a healthy eater," and "When I eat healthy, I really feel like I'm taking control of my food choices." The attitude measure based on feelings toward junk food advertising and impressions taken from new found information regarding such ads is specific to the Gatorade drink ad and asks: "How much does this ad make you want to drink this product?"

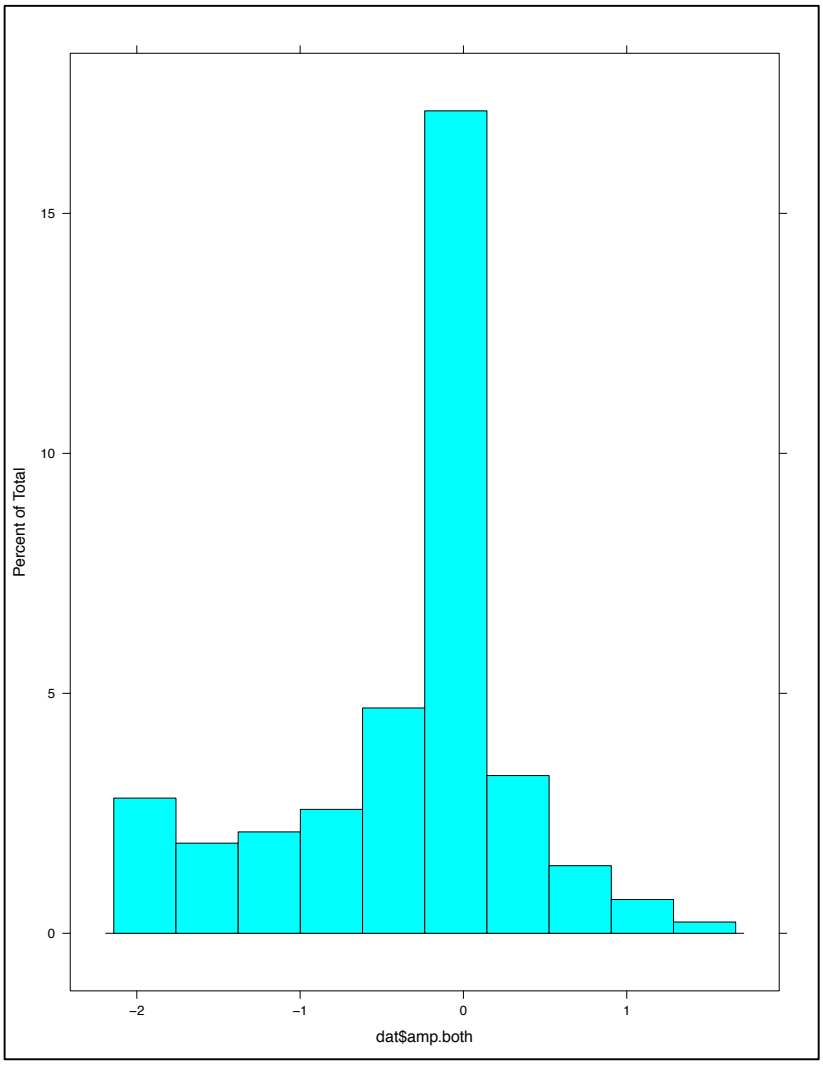
After Day 2 of the AMP task, the research team returned to the school during which time the participants of the study were provided with a snack form that had healthy and unhealthy food choices listed. The healthy options were: fruit, carrots, trail mix, water, and sparking mineral water. The unhealthy options were: Cheetos, Doritos, Oreos, Hi-C, Coke, and Sprite. The students were asked to choose 2 snacks and a drink that they would like and were brought these snacks to enjoy a few days later. The purpose of this was to evaluate what food choices the students made in conjunction with their implicit attitudes towards those foods.

Results

The data acquired from this pilot task is somewhat lacking. The reason for such a small sample size on Day 1 of data collection and for a loss of some students on Day 2 is due to a glitch in the software being used to administer the task, and other unseen technological issues. There are two difficulties that resulted from this situation. First, it is difficult to make a significant correlation between the small sample size from Day 1 to a larger one on Day 2, while still claiming validity. Second, it would not be an appropriate representation of the participants if Day 1 and Day 2 samples were to be evaluated separately. Instead, during the process of data clean-up, a composite score of both days of AMP data were combined to create one sample that gave a larger sample size for each correlation made.

The following is an outline of the process taken, to get to the point of combined AMP data with behavioral attitudes from baseline assessment. The first task was to create proportions of trials marked as pleasant for junk food primes of the total trials and for healthy food images of the total trials. The second task was to take the average of the junk food and healthy food proportions for Day 1 and Day 2, respectively. Using these two data points, a ratio of the proportion of junk food from Day 1 over average of all data from Day 1 was created, and the

same done for Day 2. This process was also replicated for Day 1 and Day 2 data of healthy food primes. Then, using these ratios, the difference was taken between the healthy food ratio from the junk food ratio for Day 1 and the same for Day 2. These two differences of the ratio from Day 1 and Day 2 were then combined to create one set of data. This is a valid combination of data samples because the data showed little change in the implicit attitudes of the participants during the course of the month of the study, from Day 1 to Day 2. The result was a normal distribution curve of the composite AMP data received, better sample size, and a number of independent observations in the data set. In this preliminary histogram, the numbers appear to be over-representing some towards the middle of the curve and then filter out into the tails of the curve. This AMP data is then correlated with behavioral attitudes from post-intervention measurement in order to bolster the data more.



The statistical test of normality produced this normal distribution curve of composite AMP data pictured above.

The goal of the AMP task was to validate an implicit measure of food attitudes by predicting explicit food attitudes. This is shown through the correlation between identity, behavior, and implicit attitudes over the course of a month. The idea is that people who see themselves as healthy eaters presumably hold more positive implicit attitudes toward healthy foods and more negative implicit attitudes towards unhealthy food. This assumption is validated with the results of this data. This is demonstrated in the correlation tests, between the combined

AMP data and the self-reported behavioral measures. When doing regression analysis, the intention is to have a statement from the results that says this predictor predicts this certain outcome. With my data, the target statement to achieve is that the AMP data should predict the self-identity measures outcome. The data shown in Table 1 is representative of that.

For the measure, "I want to think of myself as a healthy eater" and combined AMP data, there was a negative correlation between the two variables, $r = -.27$, $p = < 0.022$. This can be translated as such that as the AMP measure goes up, the attitude measure goes down, which is portrayed in its corresponding graph, Figure 1. The negative correlation leads us to believe and that students that are more likely to say that junk food is pleasant over healthy food, are less likely to think of themselves as a healthy eater. For the measure, "I like the idea of being a healthy eater," there was a negative correlation between it and combined AMP data, resulting in $r = -0.33$, $p = < 0.004$. The graph for the results of this measure, titled Figure 2, shows that for students who choose junk food to be more pleasant than healthy food, those students are less likely to say that they enjoy the idea of being a healthy eater. With the measure, "When I eat healthy, I really feel like I'm taking control of my food choices" and combined AMP data, there was a negative correlation between the two variables, resulting in $r = -0.28$, $p = < 0.0164$. This negative correlation is demonstrated on the graph labeled Figure 3 and reiterates that students that chose junk food to be more pleasant during the AMP task, are less likely to feel as if they are taking control of their food choices when asked to identify themselves in terms of certain behavioral attitudes. Now with the measure, "How much does this ad make you want to drink this product?" which is directed at an ad for the Gatorade drink that was presented to the participants during the intervention, the graph, Figure 4, looks different due to the positive correlation exhibited between this variable and that of combined AMP data, resulting in $r =$

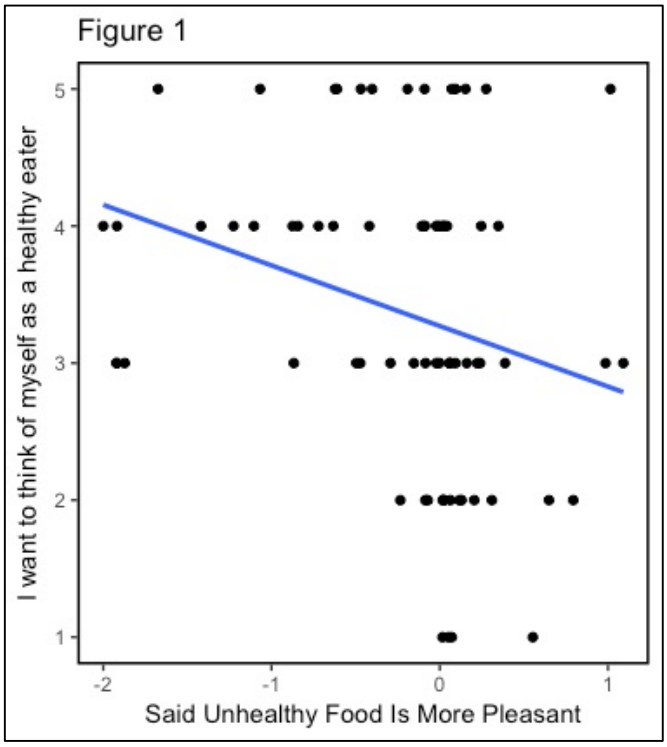
0.22, $p = < 0.066$. This positive correlation says that students that chose junk food to be more pleasant during the AMP task, were more likely to feel inclined to the Gatorade drink due to the ad they were shown. This has interesting implications for what we hope to achieve with this intervention because the idea is to alter the feelings the children get towards food advertisements from the inclination to go and consume the product, to more of an aversion to the product. This measure was recorded during the baseline assessment of the students; thus, this response is reflected of what we assumed would be children's reaction to a food advertisement, fulfilling the food industries tactics of alluring children to their products. As of now, in the early stages of the intervention, it would be reasonable to still receive this sort of result that claims the children were likely to admit to wanting to drink the Gatorade due to the ad, but the hopes are for the opposite to occur in the near future when a follow up is done to see where their attitudes lie post intervention.

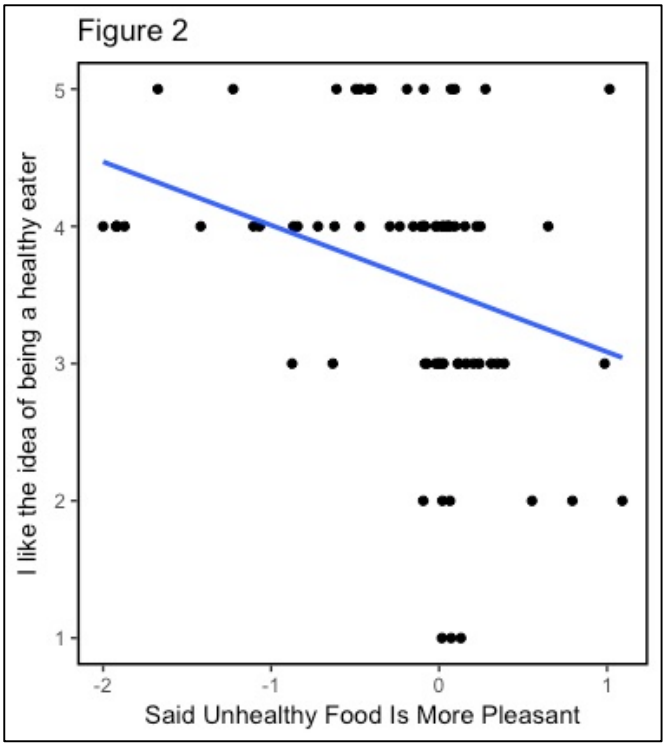
These explicit attitudes of seeing yourself as a healthy eater predicted explicit judgements of food products which are then predictive of implicit judgement of food products.

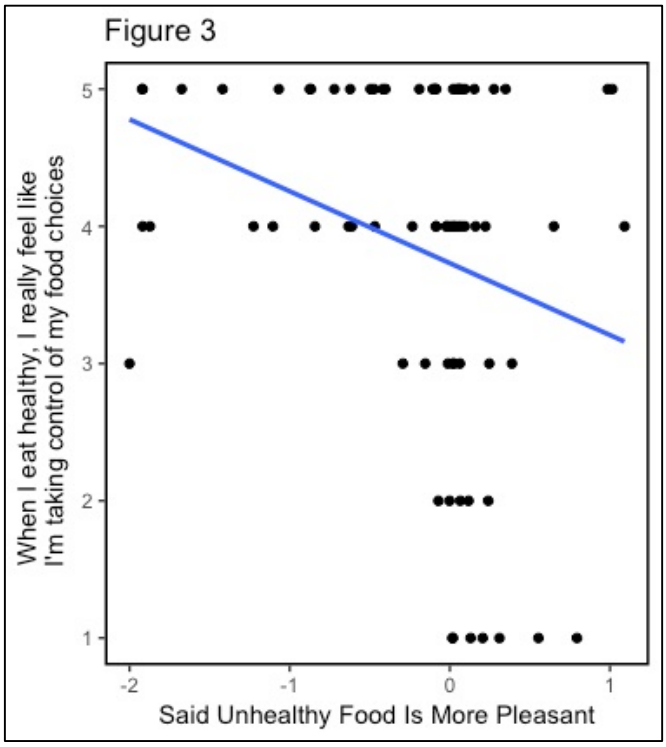
Table 1:

Measure	R - Value	P - Value
"I want to think of myself as a healthy eater"	-0.27	0.022
"I like the idea of being a healthy eater"	-0.33	0.004
"When I eat healthy, I really feel like I'm taking control of my food choices"	-0.28	0.016
"Gatorade: How much does this ad make you want to drink this product?"	0.22	0.066

Dot Graphs of AMP Data vs Self-Reported Behavioral Measures







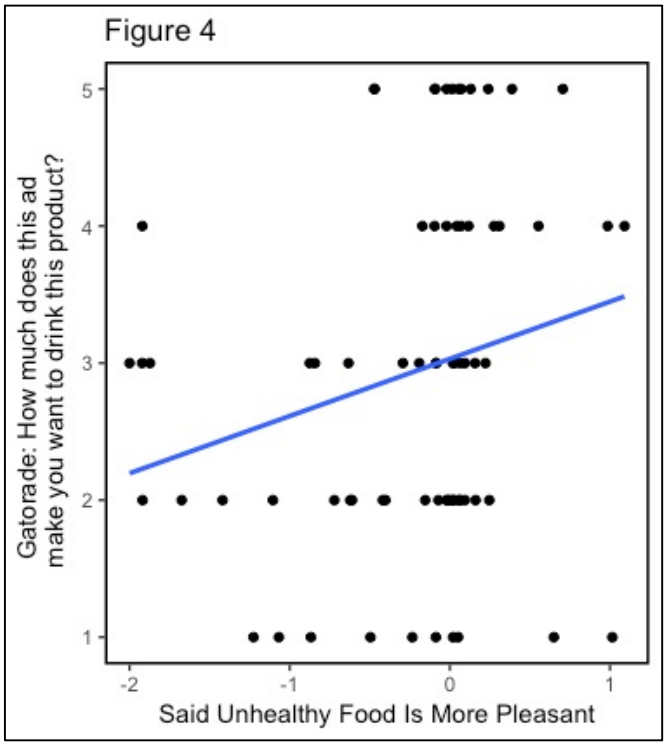


Table 2:

Snack Choice	R - Value	P - Value
Doritos	0.17	0.178
Cheetos	-0.05	0.697
Oreos	0.04	0.777
Sprite	-0.12	0.341
Coke	0.09	0.488
Fruit	0.03	0.830
Carrots	0.04	0.754
Trail Mix	-0.22	0.084
Water	0.09	0.483
HIC	-0.07	0.593
Mineral Water	0.07	0.594

As an exploratory measure, we also looked at predicting actual behavior. This was accomplished through the snack form passed out to the students post-intervention that included both healthy and unhealthy choices of snacks and drinks. Accounting for the fact that the intervention had just taken place and that behavior is more complex than just attitudes, as of now, no significant associations were found in terms of actual food choices and implicit attitudes (Table 2). Thus, further studies are definitely necessary to solidify a method of evaluating implicit attitudes and the ability to shift them to create long term success in making healthier food choices.

Limitations

This was a pilot of the utilization of the AMP task for the understanding of implicit food attitudes. Consequently, there are limitations to a first time run of this segment of the intervention. The sample size is one of the biggest factors that hinders the data in this situation because as is the case in any intervention, the larger the sample size, the more credible the data. Although the proposed number of students to be included in the study was a reasonable amount, the number of students from whom we were actually able to extract data from was very limited

due to technological glitches in the Inquisit software used to run the AMP task, the iPads on which we ran the software, and the internet connection used on these iPads. Technology can be an asset in many endeavors related to such interventions but, at this point in time, is still less visited as a tool in psychological interventions. To hone in on this tool could prove to be very beneficial for the efficiency of the lab and the studies we run, but in terms of this intervention, it proved to be costly for the sample size.

Another limitation may be the age group that was targeted in this intervention. Although 8th graders are ideal in terms of the period of adolescence in which they are in, they are however, also more difficult to keep the concentration of. While doing the task, some observations were made as to how many times a student would be gazing off into space or staring at the screen for a long time before giving a response. This gives rise to a concern that may exist in regards to how accurate those outliers may be. In Keith Payne's (2014) evaluation of the validity of the AMP measure he created, he addresses this concern and explains the average reaction time for each trial is within a few hundred milliseconds but single outliers are not so detrimental to the results of AMP as they are with other implicit measurement tests. This is due to the fact that the response metric for AMP is binary so there is no extreme score necessarily. To distinguish the outliers that could potentially be a problem, using statistical standards of three standard deviations from the mean for the latency may be reasonable but this could eliminate those students' data that is an unusually strong attitude rather than an outlier of a participant just not paying attention to the task. Thus, Payne suggests to include all data unless there is clear evidence that the data was produced by some other process and not by attitudes. However, specifically in terms of the data collected for this preliminary run of the task, it might be

beneficial to still consider doing another round of clean-up of the data in terms of outliers in latency that could be impacting the correlation of variables.

Discussion

My measure predicted self-ratings as a healthy eater and desires due to food advertising. These ratings were validated by correlating the new implicit attitudes measure to the explicit attitudes measured, over a month, in an adolescent sample. For behavioral scientists, who prefer mapping their research from behavior of the person to their attitudes, these results would be considered inconclusive as of now. However, once swipe data from the school's cafeteria is received, and we are able to look at what the kids actually purchased for their meals, over time, the results on behavior will become more conclusive.

In using the task for further trials, the goal is to triple the sample size because the glitch in data collection prevented us from having a larger sample size for more reliable data. Thus, these are the preliminary analyses from which meaningful correlations were extracted, but further data analyses remain necessary. Another aspect of the study to consider would be the way in which implicit and explicit measures are studied. The idea behind this section of the intervention as a whole is to see how valid using AMP is for determining implicit attitudes of people towards food. These implicit attitudes are then paired with explicit attitudes to measure what the difference is between automatically activated attitudes and intentionally expressed attitudes. Yet something to think about it is if the varied test structures of implicit versus explicit tests is a contributing factor to diverges in test results, and if it might be more beneficial for data analysis to equate the two tests to have similar structures. In Keith Payne's (2014) own solution to such a potential flaw, he proposes an explicit version of the implicit AMP task that shows subjects identical prime and target image sequences and subsequently asks them to rate their

feelings towards the primes without the influence of the Chinese pictographs. In his analysis of such a test, the implicit to explicit correlations were high, suggesting that some low correlations seen between the two tests may reflect differences in test procedures instead of actual implicit and explicit cognition (Payne & Lundberg, 2014). This may be something to explore as a reason for getting low correlations in some of the explicit measure tests, but also of a different way for conducting the study.

Future Directions

The government has always preferred looking at crisis management interventions to treat things such as obesity but as with most health or addiction concerns, its proves best to rely on prevention measures instead. Programs that are based in nutrition or physical activity that are implemented in schools or elsewhere, can be effective but may not prove to be the best method of long term change. The reason for this is that such interventions are based on educating kids on self-interest based reasons for why they should be motivated to improve their eating habits. This lies under the assumption that with the right amount of self-interest and the right information, the kids will exhibit enough of a motivation to make better food choices. They rely on the implied supposition that teenagers have the motivation to want to be healthier in the future from which the result is trying to teach them cognitive skills to help them make right food choices. However, to this day, this theory has not proven to be very successful.

"Classroom-based health education is an uphill battle against evolution and endocrinology, and it is not a fight we are likely to win," is a view point many experts on adolescent development have (Bryan et al., 2016). Interventions aimed at early childhood may be more effective; however, healthy habits do not necessarily survive adolescence. The time of adolescence undergoes many physiological and psychological changes, which are reflective of

changes of childhood appetites and food preferences. They also have an amount of disposable income to use, allowing them to make some of their own decisions in regards to what snacks they can buy and what brands they have started to recognize in their interactions with the environment. "A major limitation of current theories in behavioral science, then, is their inability to offer strategies that produce internalized changes in adolescent food preferences" (Bryan et al., 2016).

Instead, a new theory has been developed to harness the power of the adolescents to drive them to make healthier food choices. Adolescents are not apathetic, regardless of how much media tries to portray them as so. Rather they have a desire to live up to important values that they discuss with their peers because peer status is a key part of their development process. This power is what others might see to be a weakness of adolescents, with their desire for status and respect. Dr. David S. Yeager of the University of Texas at Austin and Dr. Christopher J. Bryan of the University of Chicago, in their study referred to in the journal article, Harnessing adolescent values to motivate healthier eating study, changes this weakness into a tool. This is used in school settings to create a sense of pro-social purpose around healthy eating while motivating self-control - so turning their desire into a positive behavior such as healthy eating. By using the values shared by adolescents of autonomy and social justice, we could be giving them the tools to create positive changes to their attitudes towards food. Using the developmentally-relevant psychological principles of want for autonomy and independence from adults, concern for social justice, and desire to develop self-identity, the intervention serves to harness this energy to work against junk food companies instead of letting them overpower the adolescents. The study's method has a no-treatment control, an active-placebo control, and a focal treatment intervention that employs a module with a notion of creating a sense of purpose

around healthy eating. Pilot data suggests that the rate at which healthy food choices were made the day after the pilot intervention almost tripled - so the goal of this study is to understand how to translate this intervention onto a large scale and with a long, lasting effect. Up until now, the study has relied on explicit measures, but what if we could change the focus of the intervention to implicit attitudes? If we change implicit attitudes towards food companies and to eating, can we change the way you make decisions of food choices for the future?

As more data is received from the school's cafeteria in which I implemented the AMP task, the idea is to look at the effect of this treatment outlined in Dr. Yeager and Dr. Bryan's study, on adolescent implicit attitudes towards junk food using the AMP task. Now that this task is validated, by correlation, it can be used to experimentally test the treatment to see if drawing on intrinsic motivations to overcome implicit associations to food is possible.

Conclusion

Food stands to be capable of bringing the people of the United States of America to a state of obesity, as its fatty, salty, and sugary nature beckons people to its consumption. Yet, as has been established, it does not act alone. With the help of the way in which the human body functions physically, emotionally, and mentally, food serves as not only a means of endurance, but also a coping and pleasure mechanism. It continues to stump the nation as food industries utilize its power to make people consumers of its products through its marketing schemes and the targeting of children who are more vulnerable to such advertisements. The government tries in the ways in which it can to combat the forces of the food industry and the rest of the environment we have built for ourselves but still, obesity rates climb. Hope remains in the way in which we can mindfully adapt our surroundings and potentially change our positive associations with the food so detrimental to our bodies, rising above the influences of a complex network of factors trying to prevent us from beating obesity.

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Biography

Saniya Hirani was born in Dallas, Texas on February 28, 1995 and has lived there ever since. She graduated from The Hockaday School in 2013 and made the move to Austin, Texas to enroll in the Plan II Honors program while also pursuing a degree in Health & Society at the University of Texas at Austin. Of her many interests, she has decided to continue on her journey to graduate school at Yale University, where she aspires to achieve her Masters of Public Health.